REMARKS

Claims 1-3, 16-22 and 25-26 are presently pending in the captioned application. Subsequent to the enclosed amendment, claim 1 is amended, claims 16-22 and 25-26 are pending as previously presented, claims 2-3 are pending as originally filed and claims 4-15, 23-24 and 27-29 are cancelled without disclaimer or prejudice as to the subject matter contained therein.

An Interview was conducted with the Examiner on March 1, 2005. Applicants would like to thank the Examiner for her time and consideration. During the Interview, the Examiner noted that incorporating the term "non-crosslinked" would render the claimed product unobvious over the prior art in view of evidence showing that the xylene insoluble content is associated with the degree of cross-linking of the foam. That indication is acknowledged with appreciation and Applicants have amended the claims accordingly.

In particular, claim 1 has been amended to contain the term "non-crosslinked" and the limitations of an outermost and innermost layer constituting said plurality of polyolefin layers. A minor typographical error changing the term "soluble" to "insoluble" was also made. Support for the term "non-crosslinked" can be found in the specification at page 14, lines 6-16 describing an xylene insoluble content.

As discussed during the Interview, one of ordinary skill in the art would know that the presently claimed xylene insoluble content of 0 to 5 wt% means a gel content as calculated by the formula:

gel fraction (%)=(W1/W0) X 100

where W1 is the xylene insoluble part (g) and W0 is the weight (g) of the specimen. See US 6,331,576 at col. 10, lines 15-23; See also US 6,167,841 at col. 5, lines 36-42.

As noted in US 6,325,956, to crosslink a polymer, a crosslinking agent must be used in an amount effective to result in at least about 10 wt% of gel content. See 6,325,956 at col. 18, lines 3-6.

However, since the presently claimed range of xylene insoluble content of 0 to 5 wt% results in a gel content outside the minimal amount to result in crosslinking, one of ordinary skill in the art would know that the instant specification inherently teaches a non-crosslinked foam. Courtesy copies of the discussed patents are submitted for review. An Information Disclosure Statement is not required given that the patents are submitted for background.

No new matter within the meaning of § 132 has been added by any of the amendments.

Accordingly, Applicants respectfully request the Examiner to enter the indicated amendments of Appendix A and allow all

presently pending claims.

1. Rejection of Claims 1-3, 16-22 and 25-26 under 35 U.S.C. § 103(a)

The Office Action maintains the rejection of claims 1-3, 16-22 and 25-26 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 5,492,741 ("Akao et al.") in view of U.S. Patent No. 6,316,587 ("Sheen et al."). The Office Action responds:

> The art rejections over Akao in view of Sheen have been maintained for the following reasons. Applicants argue that Akao relates to a cross-linked polyolefin foam sheet that is made by a normal-pressure hot-foaming method rather the presently claimed co-extrusion foaming process. Applicants go on and state that the different is critical because the foam of Akao is a cross-linked foamed polyolefin resin while the foam of the present invention is non-crosslinked. The crosslinked polyolefin foam sheet of Akao has a degree of crosslinking (a boiling xylene-insoluble content) of not less than 10% whereas the non-crosslinked polyolefin foam of the present invention has a smaller boiling xylene insoluble content of 0 to 5wt%. The arguments are not commensurate in scope with the claims. As pointed out by Applicants, the degree of crosslinking is indicative of the xylene insoluble component. However, Akao is completely silent as to the xylene content and nothing in the claims is specific about the non-crosslinked polyolefin foam. Therefore, the foam of Akao is not structurally different from the foam of the present invention. Applicants argue that the coextrusion method of the laminated polyolefin foam of the present invention provides indicia of non-obviousness. The cells on the surface part of

the foam layer made during a coextrusion method are generally destroyed when brought into contact with an adjacent layer. Applicants argue that Akao fails to teach the destroying phenomenon of cells during co-extrusion foaming. Applicants further state that this destroying phenomenon of cells was discovered by the Applicants. The question is raised whether there is any significant difference in the closed cell content of the foam layer resulted in the destroying phenomenon of cells during co-extrusion. The answer is none. Turning to the claims, claim 1 notably recites that the closed cell content is at least 60% which is indicative of predominantly closed cell structure. Akao teaches the foam having a closed cell structure. Therefore, it is the examiner's position that the closed cell ratio of the presently claimed invention does not exclude the closed cell structure of the Akao invention. Applicants argue that Akao teaches away from the claimed invention because one skilled in the art would not be motivated to increase the strength of laminated foam by increasing the thickness of the resin layer laminated onto the foam. Applicants state that cells on a surface part of the foam are destroyed if the thickness of the resin layer laminated onto the foam is increased during co-extrusion. The arguments are not found persuasive for patentability because Akao does not produce the laminated foam by co-extrusion rather by adhesive lamination. Since increasing the thickness of the resin layer laminated onto the foam during adhesive lamination would not cause any cell destruction, one skilled in the art would be motivated to increase the strength of laminated foam by increasing the thickness of the resin layer laminated onto the foam during adhesive lamination. Applicants argue that the melt flow rates alpha, beta of 3 to 35 g/10min and their ratio of at least 0.5 are critical to providing a composition having the required antistatic properties. The examiner agrees

that the Muroi declaration clearly demonstrates the criticality of the melt flow rate ratio alpha/beta to providing satisfactory antistatic properties. However, the melt flow ratio alpha/beta is not critical to providing the unexpected results over the Akao/Sheen references for the following reasons. In view of the teaching from the Sheen invention, it is known in the art to go with an antistatic agent having higher molecular weight or higher melt flow rate for its long lasting antistatic property. The antistatic agent with low molecular weight or low melt flow rate easily migrates to the polymer surface and thus deteriorate the properties of the polymer. Sheen also teaches a loss of the antistatic property is due to washing or wiping. Therefore, it is known and obvious to vary the melt flow rate ratio Alpha/beta to optimize the antistatic property of the surface layer. Discovering the optimum or workable ranges involves only routine skill in the art and is not patentable advance. Accordingly, varying the melt flow rate ratio alpha/beta to obtain the desirable antistatic properties as shown in the experiments 1 and 2 of the Muroi declaration is already known in the art and would not be considered as an unexpected result or a technical advance. Therefore, the Muroi declaration is not sufficient to overcome the art rejections as argued by Applicants. Further, Applicants disclose that the polyetheresteramide demonstrates an excellent antistatic performance regardless of the melt flow rate ratio alpha/beta (lines 20-25, page 24 of the specification). It is respectfully submitted that the Muroi declaration is not commensurate in scope with the disclosure of the present invention. Accordingly, the art rejections are maintained.

Applicants respectfully traverse the rejections because the

cited references do not teach each and every one of the presently claimed limitations of the newly amended independent claim 1. The references completely fail to teach or suggest to one of ordinary skill in the art making a non-crosslinked polyolefin foam by a co-extrusion foaming method having a xylene soluble content of 0 to 5 wt% and having an outermost and innermost layer constituting said plurality of polyolefin layers.

The presently claimed MFR ratio α/β also unexpectedly results in laminated foams that exhibit antistatic properties. The cited reference completely fails to teach the presently claimed α/β ratios imparting antistatic properties and fails to provide one of ordinary skill in the art any motivation or suggestion to make such a limitation. The lack of the *prima facie* case along with the overwhelming evidence of unexpected results provided in the previously submitted Muroi Declaration gives rise to a patentable invention.

The Rule of Law

The Federal Circuit held that a *prima facie* case of obviousness must establish: (1) some suggestion or motivation to modify the references; (2) a reasonable expectation of success; and (3) that the prior art references teach or suggest all claim

limitations. Amgen, Inc. v. Chugai Pharm. Co., 18 USPQ2d 1016, 1023 (Fed. Cir. 1991); In re Fine, 5 USPQ2d 1596, 1598 (Fed. Cir. 1988); In re Wilson, 165 USPQ 494, 496 (C.C.P.A. 1970).

However, even if a *prima facie* case of obviousness has been established, secondary considerations such as commercial success, long felt but unsolved need, failure of others, and unexpected results may nevertheless give rise to a patentable invention. Graham v. John Deere Co., 148 U.S.P.Q. 459 (1966). For example, evidence such as superiority in a property the compound shares with the prior art can rebut a *prima facie* case of obviousness. See In re Chupp, 816 F.2d 643, 646, 2 USPQ2d 1437, 1439 (Fed. Cir. 1987).

Amended claim 1

In the present application, amended independent claim 1 recites a multiple layers laminated polyolefin foam having a plurality of polyolefin layers laminated on at least one side of a non-crosslinked polyolefin foam by a co-extrusion foaming method and a boiling xylene insoluble content of 0 to 5 wt%, comprising:

an outermost layer constituting said plurality of polyolefin layers,

an innermost layer constituting said plurality of polyolefin layers,

wherein the thickness of the outermost layer constituting said plurality of polyolefin layers is 5 to 80 μm, and the density d (g/L) of said polyolefin foam, the melt flow rate X (g/10 min) of the polyolefin resin constituting the innermost layer among said plurality of polyolefin layers, and the thickness Y (μm) of the innermost layer of said plurality of polyolefin layers satisfy the following relationships (1) to (4):

$$Y \leq 0.29\ d\ X \qquad \ldots(1)$$

$$5 \leq X \leq 40 \qquad \ldots(2)$$

$$70 \leq Y \leq 300 \qquad \ldots(3)$$

$$100 \leq d \leq 300 \qquad \ldots(4)$$

wherein a thickness of an entire laminated foam is 3 to 8 mm and a closed cell ratio of the laminated foam is no less than 60%,

wherein the outermost layer contains a polymer type antistatic agent so that a surface layer resistivity is no more than 1 x $10^{13}\Omega$,

wherein a ratio (α/β) of a melt flow rate (α) of the polymer type antistatic agent and a melt flow rate (β) of the base resin constituting the outermost layer among the polyolefin layers is no

less than 0.5 and β is 3 to 35 g/10 min.

The references fail to teach all the claimed limitations

The cited references fail to teach the presently claimed limitations directed to the thickness of an entire laminated foam, an outermost layer containing a polymer type antistatic agent such that a surface layer resistivity is no more than $1 \times 10^{13}\ \Omega$, a ratio (α/β) of a melt flow rate (α) of the polymer type antistatic agent and a melt flow rate (β) of the base resin constituting the outermost layer among the polyolefin layers is no less than 0.5 and β is 3 to 35 g/10 min as well as the newly added limitation of a non-crosslinked foam.

Instead, Akao et al. teaches a cross-linked polyolefin foam sheet for a packaging material and bag for photographic film that is made by a normal-pressure hot-foaming method rather than the presently claimed co-extrusion foaming process. The difference is critical because in the hot-foaming method of Akao et al., a molten resin containing a **cross-linking** agent and a decomposable foaming agent is extruded at a temperature that is below the reaction temperature of the cross-linking agent and which is also below the decomposition temperature of the foaming agent. In other words, the foamed polyolefin resin sheet Akao et al. is crosslinked

whereas the foam of the present invention is not.

In particular, the crosslinked polyolefin foam sheet of Akao et al. has a degree of crosslinking (a boiling xylene-insoluble content) of not less than 10%. See Akao et al. at col. 3, lines 67. Akao et al. teaches a cross-linked thermoplastic resin foamed sheet of not less than 10%. The foam sheet of Akao et al. is prepared by a method in which a melt containing a crosslinking agent and a decomposition-type blowing agent is extruded at a temperature lower than the decomposition temperature of the blowing agent and the reaction temperature of the crosslinking agent to obtain a foamable sheet wherein the foamable sheet of Akao et al. is then heated at a temperature higher than the reaction temperature of the crosslinking agent.

The resulting crosslinked foamable sheet is further heated to a temperature higher than the decomposition temperature of the blowing agent to obtain the foam sheet wherein the crosslinking of Akao et al. is indicative of the xylene insoluble component disclosed by Applicants.

In contrast, the non-crosslinked polyolefin foam of the present invention has a boiling xylene-insoluble content of 0 to 5 wt%. See specification at page 14, lines 6-19. Notably, a degree of crosslinking can be represented by the xylene insoluble component. As stated supra, one of ordinary skill in the art would

know that the presently claimed xylene insoluble content of 0 to 5 wt% means a gel content as calculated by the formula:

gel fraction (%)=(W1/W0) X 100

where W1 is the xylene insoluble part (g) and W0 is the weight (g) of the specimen. See US 6,331,576 at col. 10, lines 15-23; See also US 6,167,841 at col. 5, lines 36-42. Furthermore, to crosslink a polymer, a crosslinking agent must be used in an amount effective to result in at least about 10 wt% of gel content. See 6,325,956 at col. 18, lines 3-6.

However, since the presently claimed range of xylene insoluble content of 0 to 5 wt% results in a gel content outside the minimal amount to result in crosslinking, one of ordinary skill in the art would not have had any motivation to make such a limitation in the absence of any teaching or suggestion by the references.

Turning to the Muroi Declaration, Applicants note that the melt flow rates α, β of 3-35 g/10 min and their ratio α/β of at least 0.5 are critical to providing a composition having the required antistatic properties. As shown in the Experiments 1 and 2 of the previously submitted Muroi Declaration, the MFR ratio α/β of resins of Experiments 1 and 2 is 0.3 and 0.4 and resulted in laminated foams that do not exhibit satisfactory antistatic properties.

In contrast, the α/β ratios of the present invention which

demonstrate at least one order of 10 lower surface resistivity are in a range between 2.2 to 10. See Table II of Muroi Declaration. Those of the claimed invention clearly show unexpected results over the cited references, which fail to teach α/β ratios.

The references clearly fail to teach each and every claimed limitation of the present invention. The present invention provides a non-crosslinked laminated foam prepared by coextrusion and having a closed cell ratio of at least 60% having good mechanical properties such as bending strength with a thickness of 3-8 mm, a foam layer with a density of 100-300 g/L and good antistatic properties and good appearance. The foam sheet of the references, on the other hand, are constructed to exhibit good abrasion resistance and light-shielding properties; are intended to be used as a packaging material for photographic photosensitive articles; and are produced by a method in which a **crosslinked** resin is foamed at a relatively low temperature and under ambient pressure.

Accordingly, Applicants respectfully submit that the presently claimed invention is unobvious over the cited references and respectfully request reconsideration and withdrawal of the rejections of the presently pending claims under 35 U.S.C. § 103.

CONCLUSION

In light of the foregoing, Applicants submit that the application is now in condition for allowance. The Examiner is therefore respectfully requested to reconsider and withdraw the rejection of the pending claims and allow the pending claims. Favorable action with an early allowance of the claims pending is earnestly solicited.

Respectfully submitted,

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Attorney Docket No. HOS-62
MAIL STOP AMENDMENT

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re Application of:	)	Group Art Unit: 1771
	)	
MORITA; MUROI; KAKUTA	)	Examiner: Hai Vo
	)	
Serial No. 09/996,777	)	
	)	
Filed: November 30, 2001	)	

For: **MULTIPLE LAYERS LAMINATED POLYOLEFIN FOAM**

Appendix A

Please amend the following claims as indicated in the following claims according to 37 C.F.R. § 1.121 concerning a manner for making claim amendments.

1. (Currently amended) A multiple layers laminated polyolefin foam having a plurality of polyolefin layers laminated on at least one side of a non-crosslinked polyolefin foam by a co-extrusion foaming method and a boiling xylene ~~soluble~~ insoluble content of 0 to 5wt%, comprising:

an outermost layer constituting said plurality of polyolefin layers,

an innermost layer constituting said plurality of polyolefin layers,

wherein the thickness of the outermost layer constituting said plurality of polyolefin layers is 5 to 80 μm, and the density d (g/L) of said polyolefin foam, the melt flow rate X (g/10 min) of the polyolefin resin constituting the innermost layer among said plurality of polyolefin layers, and the thickness Y (μm) of the innermost layer of said plurality of polyolefin layers satisfy the following relationships (1) to (4):

$$Y \leq 0.29\ d\ X \quad \ldots(1)$$

$$5 \leq X \leq 40 \quad \ldots(2)$$

$$70 \leq Y \leq 300 \quad \ldots(3)$$

$$100 \leq d \leq 300 \quad \ldots(4)$$

wherein a thickness of an entire laminated foam is 3 to 8 mm and a closed cell ratio of the laminated foam is no less than 60%,

wherein the outermost layer contains a polymer type antistatic agent so that a surface layer resistivity is no more than $1 \times 10^{13}\Omega$,

wherein a ratio (α/β) of a melt flow rate (α) of the polymer type antistatic agent and a melt flow rate (β) of the base resin constituting the outermost layer among the polyolefin layers is no less than 0.5 and β is 3 to 35 g/10 min.

2. (Original) The multiple layers laminated polyolefin foam according to claim 1, wherein the density d (g/L) of the polyolefin foam is 120 to 300 g/L, the melt flow rate X (g/10 min) of the polyolefin constituting the innermost layer among the polyolefin layers is 8 to 40 g/10 min, and the thickness Y (μm) of the innermost layer among the polyolefin layers is no more than 0.26dX.

3. (Original) The multiple layers laminated polyolefin foam according to claim 1, wherein the base resin constituting the polyolefin foam and the polyolefin layers in the multiple layers laminated polyolefin foam is of at least one type selected from polypropylenes and polyethylenes.

Claims 4-15 (Cancelled)

16. (Previously presented) The multiple layers laminated polyolefin foam according to claim 1, wherein the polymer-type antistatic agent comprises a compound of at least one type selected from polyetheresteramides and polyethers as the main component.

17. (Previously presented) The multiple layers laminated polyolefin foam according to claim 16, wherein the polyetheresteramide is a polymer obtained by polymerization reaction of a polyamide with an alkylene oxide adduct of a bisphenol.

18. (Previously presented) The multiple layers laminated polyolefin foam according to claim 17, wherein the polyamide is of at least one type selected from caprolactam polymer, 12-aminododecanoic acid polycondensate, and adipic acid-hexamethylene diamine polycondensate.

19. (Previously presented) The multiple layers laminated polyolefin foam according to claim 16, wherein the polyether is a compound having at least two quaternary ammonium bases and is the reaction product of (a) an oxyalkylene ether obtained by addition reaction of an alkylene oxide with a phenol-divinyl benzene addition polymer, (b) one type of glycidyl ether selected from glycidyl ethers of polyoxyalkylene glycols and glycidyl ethers of adducts of phenols and alkylene oxides, an amine compound having an aliphatic hydrocarbon group containing 1 to 22 carbon atoms, and a quaternizing agent.

20. (Previously presented) The multiple layers laminated polyolefin foam according to claim 19, wherein (a) the polyoxyalkylene ether is an adduct obtained by the addition reaction of ethylene oxide and a copolymer of ethylene oxide and propylene oxide with a bisphenol-divinyl benzene addition polymer, (b) the glycidyl ether of polyoxyalkylene glycol is glycidyl ether of polyoxyethylene glycol, and the adduct of a phenol and an alkylene oxide is an adduct of bisphenol and ethylene oxide.

21. (Previously presented) The multiple layers laminated polyolefin foam according to claim 1, wherein the polymer-type antistatic agent is present in the outermost polyolefin layer in an amount of from 2 to 30 wt.%.

22. (Previously presented) The multiple layers laminated polyolefin foam according to claim 16, wherein the polymer-type antistatic agent is present in the outermost polyolefin layer in an amount of from 2 to 30 wt.%.

Claims 23-24 (Cancelled)

25. (Previously presented) The multiple layers laminated polyolefin foam according to claim 1 wherein the closed cell ratio of the laminated foam is at least no less than 70%.

26. (Previously presented) The multiple layers laminated polyolefin foam according to claim 1 wherein the closed cell ratio of the laminated foam is at least no less than 80%.

Claims 27-29 (Cancelled)